

# North Shore Restoration Project Appendix XX

## Invasive Plants Management Plan

### Introduction

Non-native invasive plant species are among the most significant environmental and economic threats facing our country's – and indeed the world's – ecosystems. Invasive plants are defined as “non-native plants whose introduction does or is likely to cause economic or environmental harm or harm to human health” (Executive Order 13112, 1999). Invasive plants can create a variety of environmental effects that can be harmful to native ecosystem processes, including: displacement of native plants, reduced habitat and forage for wildlife and domestic livestock; alteration of physical and biological properties of soil, and loss/degradation of special habitats such as riparian areas and meadows. Economic costs include the direct cost of controlling invasive species, as well as indirect costs such as degraded livestock forage and lost or reduced recreation opportunities (USDA Forest Service 2013).

### Treatment Strategy

Infestations of invasive species would be prioritized based on relative impacts and locations. Early invaders with high environmental impacts (as determined by the California Department of Food and Agriculture (CDFA) and the California Invasive Plants Council (Cal-IPC) and/or small, isolated infestations will be the highest priority for treatment. Infestations with a high potential for future spread, including those found in high traffic areas such as recreation sites, staging areas, and administrative sites will also be considered high priority. The leading edge or satellite occurrences of established infestations will be higher priority than the large established infestations themselves.

### Treatment Methods

The proposed control approach will employ a combination of treatment methods. Successful treatments often require multiple years of treatment and multiple treatments per year. Treatments are tailored depending on the biology of the target species, site conditions such as density and age of infestation, and effectiveness of any prior treatment efforts. Treatments will include manual or mechanical methods such as hand pulling and cutting; these methods are previously approved for use in the project area and will continue to be used. Herbicide application is proposed in this project, and any herbicide will be applied by hand using backpack sprayers. Aerial or broadcast applications are not being proposed for this project.

Manual and mechanical methods are generally considered feasible when populations remain under a thousand plants and/or when woody species are small enough to be hand-pulled. Some species, including perennial species that resprout vigorously and/or have a deep or rhizomatous root system, can only be effectively controlled with herbicide. Specific herbicides proposed and target species for each are detailed below.

### Current Conditions

The Ranch Fire area was widely (although not completely) surveyed for invasive species in 2019, especially targeting areas near roads and suppression disturbance. Based on these and previous surveys, there are 253 mapped locations of 13 different non-native invasive species within the North Shore project area. These sites comprise a total of 435 acres; see Table XX.

Table XX. Summary of invasive plant species found in the North Shore project area.

Species	Common Name	# Sites	Acres	Priority
<i>Bromus madritensis ssp. rubens</i>	Red brome	17	169.1	3
<i>Bromus tectorum</i>	Cheatgrass	20	109.6	3
<i>Carduus pycnocephalus</i>	Italian thistle	13	8.9	2
<i>Centaurea melitensis</i>	Maltese starthistle	9	1.6	2
<i>Centaurea solstitialis</i>	yellow starthistle	32	6.4	2
<i>Cirsium vulgare</i>	bull thistle	32	23.4	2
<i>Foeniculum vulgare</i>	sweet fennel	1	0.1	1
<i>Hypericum perforatum</i>	Klamathweed	56	10.8	2
<i>Melilotus officianalis</i>	white sweet clover	1	0.2	1
<i>Rubus armeniacus</i>	Himalayan blackberry	8	5.3	3
<i>Spartium junceum</i>	Spanish broom	2	0.4	1
<i>Taeniatherum caput-medusae</i>	medusahead	14	3.9	2
<i>Verbascum thapsus</i>	common mullein	48	95.7	2
<b>TOTAL</b>		<b>253</b>	<b>435.4</b>	

Each species is assigned a priority rank for treatment. Priority rank 1 species are targeted for eradication in the project area, due to the presence of very few sites and very little total acreage. Priority 2 species are targeted for control, with eradication of small and/or remote sites. Priority 3 species are generally fairly widespread on the landscape, and are targeted for containment. In addition to the species-level priority ranks, certain sites, such as landings, parking and staging areas, will also be assigned a higher priority for treatment.

### Herbicide Application

The specific proposed herbicides are listed in Table XX below. All herbicides are registered for use in the USA as well as in California. The herbicides will all be applied at or below the label rate. Adjuvants are used to increase the efficacy and efficiency of herbicide applications. For the proposed applications, herbicides will tank-mixed with a methylated seed oil surfactant and a marker dye. The seed oil surfactant is used to increase sticking to the target species (reducing runoff), as well as increasing penetration through the waxy cuticles common in plants. The marker dye is used to visually track application and thus minimize over- and under-application.

Table XX. Proposed herbicides, target species, and maximum annual application rate

Herbicide	Target Species	Max. application rate
Aminopyralid	starthistle, thistles, klamathweed, sweetclover	7 oz/acre
Fluazifop	cheatgrass, medusahead, red brome	1 pint/acre
Imazapyr	mullein, fennel, landings	1 quart/acre
Triclopyr BEE	broom, blackberry	2 quarts/acre

### Standard Herbicide Treatment Procedures

1. Herbicides will be applied by trained and/or certified applicators in accordance with label directions and applicable federal and state pesticide laws.
2. Weather conditions (wind speed and direction, probability of precipitation, temperature, temperature inversions, atmospheric stability, and humidity) will be carefully monitored before and during herbicide applications to minimize drift, volatilization, and leaching or surface runoff of herbicides, based on label instructions.
3. Prior to the start of spray applications, spray equipment will be calibrated to ensure accuracy of delivered amounts of herbicide. Equipment will be regularly inspected during herbicide applications to ensure it is in proper working order.
4. Herbicide spray applications will not occur when wind speeds exceed label restrictions. Consider application-specific factors (e.g. pesticide and adjuvant properties; application equipment, height, pattern and technique; target vegetation density, size, and acreage; proximity to sensitive resources; temperature and humidity; and wind speed and direction) to ensure spray applications do not result in unacceptable drift.
5. Herbicide application will be carefully evaluated following precipitation and/or when runoff, soil saturation, standing water, or heavy dew is present or expected, to ensure the application will not result in herbicides entering surface or groundwater. Application will occur only under favorable weather conditions, generally defined as: 20% or less chance of rain (based upon NOAA forecasting) within 48 hours of application.
6. Mixing and loading herbicides will take place at least 150 feet from any surface water, and will only occur on level, disturbed sites.
7. A spill cleanup kit will be readily available whenever herbicides are transported or stored. Proper Personal Protective Equipment (PPE) will be worn or carried by the applicator(s) at all times when using herbicides.
8. To limit overspray and drift during herbicide applications, low pressure nozzles with coarse droplets will be used, and spray nozzles will be kept as close as possible to target plants.
9. Equipment, vehicles, clothing, and personal items will be inspected and cleaned as necessary to ensure they are free of soil, seeds, vegetative matter or other debris prior to entering new treatment areas or moving from one infestation to another.
10. If any special status plant species are discovered in a proposed herbicide treatment area, no herbicide will be applied within 25 feet of the plants. Target invasive plants within this buffer will be treated manually.
11. No herbicides will be applied within 10 feet of any surface water, including streams, ponds, and wetlands.

## References

Executive Order 13112 of Feb 3, 1999. Invasive Species. Federal Register, Volume 64, Number 25. FR Doc. 99-3184.

USDA Forest Service. 2013. Forest Service National Strategic Framework for Invasive Species Management. FS-1017.

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